AF/2828

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

OIPE JC177 FEB 2 4 2004 PATENT & TRADEMARK OFFICE

In re Patent Application of: Atty Dkt. 925-217
C# M#

OSHIMA, N. et al. TC/A.U.: 2828

Serial No. 09/987,921 Examiner: Vy, Hung

Filed: November 16, 2001 Date: February 24, 2004

Title: SEMICONDUCTOR LASER DEVICE CAPABLE OF SUPPRESSING LEAKAGE CURRENT IN A LIGHT EMITTING END SURFACE AND METHOD FOR MANUFACTURING SAME

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☐	**NOTICE OF APPEAL** Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner. ($ 330.00)	$	
☒	An appeal **BRIEF** is attached in triplicate in the pending appeal of the above-identified application ($ 330.00)	$	330.00
☐	Credit for fees paid in prior appeal without decision on merits	-$ (	)
☐	A reply brief is attached in triplicate under Rule 193(b)		**(no fee)**
☐	Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s) **($110.00/1 month**; $420.00/2 months; **$950.00/3 months**; $1480.00/4 months)	$	
		SUBTOTAL $	330.00
☐	Applicant claims "Small entity" status, enter ½ of subtotal and subtract ☐ "Small entity" statement attached.	-$(	)
		SUBTOTAL $	330.00
	Less month extension previously paid on	-$(	0.00)
		TOTAL FEE ENCLOSED $	330.00

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140.** A duplicate copy of this sheet is attached.

1100 North Glebe Road, 8th Floor
Arlington, Virginia 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100
JAR:caj

NIXON & VANDERHYE P.C.
By Atty: Joseph A. Rhoa, Reg. No. 37,515

Signature: _____

OIPE JC177
FEB 2 4 2004
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of

OSHIMA, N. et al. Atty. Ref.: 925-217

Serial No. 09/987,921 TC/A.U.: 2828

Filed: November 16, 2001 Examiner: Vy, Hung

For: SEMICONDUCTOR LASER DEVICE CAPABLE OF SUPPRESSING LEAKAGE CURRENT IN A LIGHT EMITTING END SURFACE AND METHOD FOR MANUFACTURING SAME

* *

February 24, 2004

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Applicant hereby appeals to the Board of Patent Appeals and Interferences from the last decision of the Examiner.

REAL PARTY IN INTEREST

The real party in interest is Sharp Kabushiki Kaisha, a corporation of the country of Japan.

RELATED APPEALS AND INTERFERENCES

The appellant, the undersigned, and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

02/25/2004 SSANDARA 00000006 09987921
330.00 OP
01 FC:1402

STATUS OF CLAIMS

Claims 1-3 and 5-9 are pending and have been rejected. No claims have been substantively allowed.

STATUS OF AMENDMENTS

No amendments have been filed since the date of the Final Rejection. However, the Response After Final filed October 1, 2003 has been entered and considered by the Examiner as evidenced by the Advisory Action dated October 15, 2003.

SUMMARY OF EXAMPLE EMBODIMENTS OF THE INVENTION

For purposes of example and without limitation, certain example embodiments of this invention relate to a semiconductor laser device including an active layer and a protective coating formed on a light emitting surface(s) thereof, wherein the active layer is comprised of GaAlAs. The *active layer of GaAlAs 53 is uniform with respect to absorption of an emission wavelength throughout its entire length* including at respective end portions thereof, as the instant application explains that the active layer is deposited in the same manner throughout its length and is not partially plasma irradiated.

Fig. 1 of the instant application illustrates an active layer 53 of GaAlAs, and Si film 52a formed on the light emitting surface 51a of laser chip 51. The Si film 52a is formed between the light emitting surface 51a and the oxide protective coating 52b. The protective coating 52b comprises Al_2O_3 or the like. The provision of Si film 52a is advantageous in that, when coating 52b is formed, film 52a prevents oxygen with high energy from colliding or bonding with the light emitting end surface 51a, and allows for

control of damage in the vicinity of the light emitting end surface 51a (e.g., pg. 16, lines 12-25). Si film 52a is formed to have a film thickness of approximately 40 Å or less. This small thickness makes it possible to eliminate generation of leakage current in the Si film (light emitting end surface) and prevents/reduces negative influence on oscillation characteristics of the laser device (e.g., pg. 15, lines 5-10). Moreover, the protective layer prevents oxygen from entering the active layer 53 thereby allowing the active layer 53 to maintain its uniformity with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof.

ISSUE

1. Whether claims 1-3 and 5-9 are anticipated by Horie (US 6,323,052) under 35 U.S.C. Section 102(e).

GROUPING OF CLAIMS

The sole claim grouping is as follows:

- Claim 1 (all other claims stand/fall therewith).

ARGUMENT

It is axiomatic that in order for a reference to anticipate a claim, it must disclose, teach or suggest each and every feature recited in the claim. See, e.g., Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983). The USPTO has the burden in this respect.

Moreover, the USPTO has the burden under 35 U.S.C. Section 103 of establishing a *prima facie* case of obviousness. In re Piasecki, 745, F.2d 1468, 1471-72,

223 USPQ 785, 787-88 (Fed. Cir. 1984). It can satisfy this burden only by showing that some objective teaching in the prior art, or that knowledge generally available to one of ordinary skill in the art, would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Before the USPTO may combine the disclosures of the references in order to establish a *prima facie* case of obviousness, there must be some suggestion for doing so. In re Jones, 958 F.2d 347 (Fed. Cir. 1992). Even assuming, *arguendo*, that a given combination of references is proper, the combination of references must in any event disclose the features of the claimed invention in order to render it obvious.

Claim 1 (together with claims 2-3 and 5-9)

Claim 1 stands rejected under 35 U.S.C. Section 102(e) as being allegedly anticipated by Horie. This Section 102(e) rejection should be reversed for at least the following reasons.

Claim 1 requires that "the semiconductor laser device includes an active layer comprised of GaAlAs, wherein said active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof." As explained in the instant specification, the active layer 53 is deposited in the same manner throughout its length, and oxygen is prevented from entering the layer at ends thereof due to the protective layer(s); thereby allowing the GaAlAs active layer to be uniform with respect to absorption of an emission wavelength throughout its length including at end portions thereof. For instance, appellant has surprisingly found that good results can be achieved as shown in Fig. 4 of the instant application by using the

claimed structure recited in claim 1, as opposed to the non-uniform absorption structure of Horie.

Horie fails to disclose or suggest the aforesaid underlined aspect of claim 1. Horie discloses a light emitting device which, as shown in Fig. 1 of Horie, includes a-Si film 14 and a dielectric layer 15, 16 which may be of aluminum oxide. However, in direct contrast with claim 1, Horie expressly requires that the active layer is much more transmissive to emission wavelengths in the vicinity of the end facets than at other locations. Horie achieves the desired *non-uniformity* of absorption by irradiating the facets of the active layer with plasma or the like (the so-called window structure) (e.g., Abstract, lines 11-12; col. 4, lines 12-17 and 44-58; and col. 18, lines 27-56). In fact, Horie states that this irradiation of the facets of the active layer to make them non-uniform with respect to absorption compared to the rest of the active layer is the entire "basis" of Horie's invention (col. 4, lines 52-59). Thus, it is clear that Horie fails to disclose or suggest "*an active layer comprised of GaAlAs, wherein said active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof*" as required by claim 1. Indeed, Horie teaches the opposite of claim 1 by teaching that non-uniformity of the active layer is required at end portions thereof.

In Horie, in contrast to claim 1, it is critical that the active layer is much more transmissive to emission wavelengths in the vicinity of the end facets than at other locations. Exhibit 1 attached to the Response After Final filed October 1, 2003 includes Horie's Examples 1-2 and Horie's Comparative Examples 1-3. Comparing Horie's Examples 1-2 with Horie's Comparative Examples 1-3 as shown in Exhibit 1, it is clearly

understood that the process of irradiating the facet with plasma (process for window structure) in order to cause the active layer to be more transmissive near the facets than at other areas is essential for Horie's invention. This is because Horie's Comparative Examples 1-3 have no window structure and thus (a) failed the accelerated life test, (b) had undesirable Ga-O/As-O on the facet, and (c) had undesirable band energy characteristics in the vicinity of the facets. The only way in which one of ordinary skill in the art would ever have modified Horie's test-failing Comparative Examples given Horie's teachings would have been to conform to the test-passing Examples which teach directly away from the invention of claim 1.

In contrast with Horie, the invention of claim 1 uses a an active layer comprised of GaAlAs (as opposed to the undoped InGaAs used in Horie's Examples), wherein the active layer is *uniform with respect to absorption of an emission wavelength throughout its entire length including at respective end portions thereof.* Applicant has surprisingly found for example that good results can be achieved as shown in Fig. 4 of the instant application by using the claimed structure recited in claim 1, as opposed to the non-uniform structure of Horie.

It can be seen from the above that Horie teaches directly away from the invention of claim 1 because Horie teaches that it is critical to create non-uniformity by using the window structure. Horie cannot possibly anticipate or otherwise render the invention of claim 1 unpatentable. Moreover, one of ordinary skill in the art would never have modified Horie to meet this aspect of claim 1 because to do so would destroy the very "basis" of Horie's alleged invention which is to provide an active layer which is much more transmissive at ends thereof than at the central portion thereof.

In the Advisory Action, the Examiner contends that Figs. 24-25 of Horie anticipate the invention of claim 1. The Examiner is wrong. Fig. 24 of Horie illustrates a device where the active layer extends throughout the entire length of the laser device. Thus, in Figs. 24 of Horie, the ends of the active layer (quantum well) are irradiated by plasma irradiation in order to create non-uniformities of absorption at the ends of the active layer (col. 17, lines 33-50). In particular, the irradiation of the ends of the active layer causes the end portions of the active layer to be more transparent to the emission wavelength of the laser (col. 17, lines 36-39). This is the opposite of what claim 1 requires. Moreover, in Fig. 25 of Horie the ends of the active layer are also irradiated with radiation to cause non-uniformity of absorption at the irradiated end portions (col. 19, lines 58-64). Again, the irradiation of the ends of the active layer in Fig. 25 causes the end portions of the active layer to be more transparent to the emission wavelength of the laser. Thus, it is clear that Figs. 24-25 fail to disclose or suggest "*an active layer comprised of GaAlAs, wherein said active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof*" as required by claim 1.

On page 2 of the Advisory Action, the Examiner states that Figs. 1A, 2A and 3A of the instant application illustrate a uniform active layer throughout its length, but that Figs. 1B, 2B and 3B do not because "the active layer is end before the facet." It appears as if the Examiner may have missed the point of claim 1 in this regard. Claim 1 states that the active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions *of the active layer*. It is irrelevant in claim 1 where the active layer ends, so long as it is uniform with respect to absorption of an emission wavelength throughout its entire length. This is clearly

supported by Figs. 1B, 2B and 3B which illustrate final products where the active layer (53, 63, 73) terminates before the ends of the laser device at light emitting end surfaces (51a, 51b, 61a, 61b, 71a, 71b) which are in contact with films (52a, 54a, 61a, 72a, 75, and/or 65). In this regard, the Examiner cannot argue that an intermediate product of Hori (i.e., before plasma irradiation) meets claim 1 because Hori only applies the Si film after the plasma irradiation has been completed (claim 1 calls for a product with an Si film having the claimed characteristics).

Finally, the Examiner argues in the Advisory Action that Horie discloses in col. 6, lines 62-68 and col. 12, lines 9-15 that an "active layer is the same material and uniform the same as the invention." Again, the Examiner is incorrect in this regard. The portion of col. 6 referred to by the Examiner merely mentions that a facet is coated with an aluminum oxide layer. This has nothing to do with the invention of claim 1 where an active layer comprised of GaAlAs is uniform with respect to absorption of an emission wavelength throughout its entire length. In a similar manner, Horie at col. 12, lines 9-15 says nothing about an active layer that is uniform with respect to absorption of an emission wavelength throughout its entire length. Instead, as explained above, Horie repeatedly states that active layers according to Horie must be plasma irradiated at end portions thereof so as to cause non-uniformity of absorption which is the precise opposite of what claim 1 requires. Claim 1 cannot possibly be anticipated by Horie.

CONCLUSION

In conclusion it is believed that the application is in clear condition for allowance; therefore, early reversal of the Final Rejection and passage of the subject application to issue are earnestly solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____
Joseph A. Rhoa
Reg. No. 37,515

JAR:caj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

APPENDIX

CLAIMS ON APPEAL

1. A semiconductor laser device, comprising:

an oxide formed as a protective coating on at least one light emitting end surface of a semiconductor laser chip;

an Si film having a film thickness of 40 Å or less formed between the at least one light emitting end surface and the oxide protective coating; and

wherein the semiconductor laser device includes an active layer comprised of GaAlAs, wherein said active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof.

2. The semiconductor laser device as claimed in claim 1, wherein the Si film has a film thickness of from 5 Å to 30 Å.

3. The semiconductor laser device as claimed in claim 1, wherein the oxide protective coating comprises Al_2O_3.

5. The semiconductor laser device as claimed in claim 1, wherein the Si film has a silicon purity of 99.99% or more.

6. A method for manufacturing the semiconductor laser device as claimed in claim 1, comprising forming the Si film and the oxide on the at least one light emitting end surface in succession within same equipment without exposing the surface to the air.

7. A method for manufacturing the semiconductor laser device as claimed in claim 1, comprising forming the Si film and the oxide through vacuum deposition.

8. The laser device of claim 1, wherein the oxide protective coating comprises Al_2O_3.

9. A semiconductor laser device, comprising:

a semiconductor laser chip;

a protective coating comprising Al_2O_3 formed on a light emitting end surface of the semiconductor laser chip;

an intermediate film comprising silicon having a thickness of 40 Å or less formed between the light emitting end surface of the chip and the protective coating comprising Al_2O_3; and

wherein the semiconductor laser device includes an active layer comprised of GaAlAs, wherein said active layer is uniform with respect to absorption of an emission wavelength throughout its length including at respective end portions thereof.